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10/053,679

01/21/2002

Robert J. Smith

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10/07/2005

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EXAMINER

BELLO, AGUSTIN

ART UNIT

PAPER NUMBER

2633

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Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/053,679

Applicant(s)

SMITH, ROBERT J.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2005.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 26-89 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-24 and 26-89 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 4/11/05, 3/21/05
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood (U.S. Patent No. 5,757,523) in view of Schwemmer (U.S. Patent No. 5,255,065).

Regarding claims 1, 11, 24, 35, 36, 47, 48, 57, 68, 77-89, Wood teaches passing an one or more optical signals (reference numeral 29a-c in Figure 7), the one or more optical signals containing data and being composed of radiation of a plurality of differing wavelengths (e.g. WDM in column 5 lines 60-63), through a diffractive optical element (reference numeral 14 in Figure 7) to form a plurality of signal segments (reference numeral 29a-c in Figure 7), each signal segment having a different mean wavelength (column 5 lines 54-57); and detecting data in each of said plurality of signal segments at a different spatial location (locations represented by reference numeral 29a-c in Figure 7). Wood differs from the claimed invention in that Wood fails to specifically teach the plurality of spaced apart detectors are located substantially at a different focal point, the focal points being at different positions along a common optical axis. However, Schwemmer teaches this concept (see Figure 4). One skilled in the art would have been motivated to employ a detection apparatus such as that taught by Schwemmer in conjunction with the device of Wood in order to separate different wavelengths along a common optical axis (column 4 lines 1-5 of Schwemmer). Therefore, it would have been obvious to one

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skilled in the art at the time the invention was made to employ a reception apparatus such as that taught by Schwemmer in conjunction with the device of Wood.

Regarding claims 2, 49, Wood teaches transmitting each of said optical signals through atmospheric distortion (e.g. air) but differs from the claimed invention in that Wood fails to specifically teach that the data rate is greater than one gigabit/second for each wavelength. However, data rates of greater than 1 Gbps over free-space are well known in the art and would have been achievable with the system of Wood.

Regarding claims 3, 21, Wood teaches that the diffractive element is a hologram (column 3 lines 57-63).

Regarding claims 4, 15-17, 50-51, 69-71, Wood teaches that a first portion of the optical signal is passed through a phase retarder (column 4 lines 45-50) located in a central portion of the diffractive optical element (reference numeral 12 in Figure 1) and wherein the first portion of the optical signal has a different phase than a second portion of the optical signal that is not passed through the phase retarder (inherent in the use of a phase retarder) and wherein said first portion is the radiation in the optical signal that contacts the diffractive optical element within a radial distance of a center of the diffractive optical element while said second portion is the radiation that contacts the diffractive optical element outside the radial distance (as seen in Figure 2a).

Regarding claims 5, 52, 59, 72, Wood teaches that in the detecting step, each of the plurality of signal segments is detected by a different detector (inherent in that each of the signals 29 falls on a different detector in Figure 7 when applied to the scenario in Figure 4).

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Regarding claims 6, 7, 18, 19, 26, 38, 53, 58, 61, 73, 74, Wood teaches that in the detecting step, the mean wavelength of at least one of the signal segments is reduced before the at least one of the signal segments contacts a detector and the spot size of the signal segment is reduced by a lens (via reference numeral 16 in Figure 1a).

Regarding claims 8, 20, 54, Wood inherently teaches that after the passing step and before the detecting step, the plurality of signals is reflected by a reflective surface (inherent in the free-space nature of the signals, e.g. reflecting off of any surface between the transmitter and the receiver).

Regarding claims 9-10, 22-23, 55-56, 75-76, Wood differs from the claimed invention in that Wood fails to specifically teach that the optical signal has a beam size at an aperture of a source transmitter associated with the optical signal that is less than an atmospheric inner scale and that the beam size at the transmitter is no more than about 10 mm. However, one skilled in the art would clearly have recognized that it would have been possible to scale the beam size to any convenient size including less than 10 mm. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to scale the beam size to a size less than 10 mm.

Regarding claim 12, Wood teaches that each of the detectors is located in an end-to-end configuration relative to the adjacent detector (see Figure 4 with the houses being the detectors and Figure 7 with the patterns directed to adjacent detectors).

Regarding claims 13, 14, 29, 30, 33, 37, 41, 42, 60, 63, 64, Wood teaches that the longitudinal axes of each of the detectors are at least substantially parallel to each other and collinear (see Figure 4 and 7).

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Regarding claims 27, 39, Wood teaches a reflective surface positioned on a first side of the at least one diffractive optical element (column 5 lines 17-25).

Regarding claims 28, 40, 62, Wood teaches at least some of the plurality of detectors are located in a hole (reference numeral 30a in Figure 2a) in the at least one diffractive optical element.

Regarding claims 31, 43, 65, Wood teaches that at least one diffractive optical element has an obscuration (as seen in Figure 2a) and at least one of the plurality of detectors is located in a shadow of the obscuration with respect to radiation having a wavelength different from a wavelength of radiation converging on the at least one detector (inherent in the overlap of signals at the far-field).

Regarding claims 32, 44, 66, Wood teaches that that least one of the detectors is integral with the corresponding immersion lens (Figure 1a).

Regarding claim 34, Wood differs from the claimed invention in that Wood fails to specifically teach that an aperture size of the holographic unit exceeds the Fresnel scale. However, one skilled in the art would clearly have recognized the ability to scale the aperture size of the holographic unit to any required size including a size exceeding the Fresnel scale. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to scale an aperture size of the holographic unit so that it exceeds the Fresnel scale.

Regarding claims 45 and 46, Wood differs from the claimed invention in that Wood fails to specifically teach the dimensions of the first and second lens. However, such limitations are a matter of design choice and could have been duplicated by one skilled in the art at the time the

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invention was made. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to select the dimension claimed.

Regarding claim 67, Wood differs from the claimed invention in that Wood fails to specifically teach that the first lens has a focal length and the reflective surface is located at a distance from the first lens that is approximately equal to 50% of the focal length. However, one skilled in the art would clearly have recognized the ability to establish the focal lengths of the lenses at any of a variety of positions including those that result in the claimed distances. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to establish the length claimed.

Response to Arguments

3. Applicant's arguments with respect to claim 1-89 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AB


AGUSTIN BELLO
PATENT EXAMINER